

universe

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Lab will manage new Earth science missions

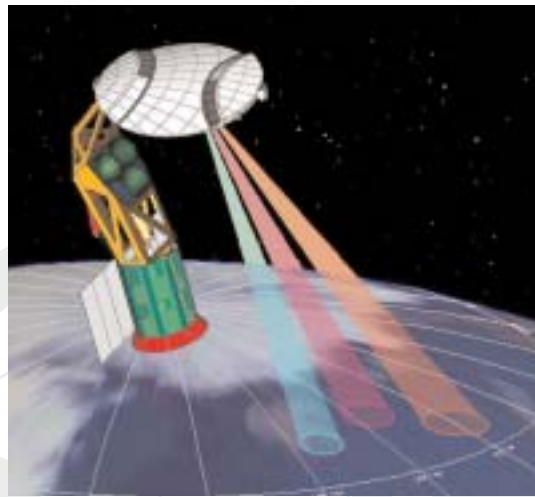
By Mark Whalen

Artist's renderings show
(clockwise from top)
Aquarius, the Orbiting
Carbon Observatory
and Hydros.

I b e m e e A R T H

JPL WILL MANAGE *two new missions selected by NASA as part of the Earth System Science Pathfinder small-satellite program that will yield fresh insight into our home planet's carbon cycle and how oceans affect and respond to climate change—knowledge that will help better life here on Earth.*

Partnering with NASA centers, universities, industry and international participants, the Orbiting Carbon Observatory and the Aquarius missions will enhance NASA's mission: to better understand and protect our home planet.



In addition to the two selected new missions, a third proposal from JPL, called Hydros, has been selected to serve as an alternate to the selected missions, should the primary missions encounter difficulties during the initial development phases.

“THE ORBITING CARBON OBSERVATORY will provide global measurements of atmospheric carbon dioxide needed to describe the geographic distribution and variability of carbon dioxide sources and sinks,” said Dr. Ghassem Asrar, associate administrator for Earth Science, NASA Headquarters, Washington, D.C. “Aquarius will provide the first-ever global maps of salt concentration on the ocean surface, a key area of scientific uncertainty in the oceans’ capacity to store and transport heat, which in turn affects Earth’s climate and the water cycle,” he added.

“We are extremely excited about participating in these breakthrough missions,” said Dr. Diane Evans, JPL's Earth science and technology director. “Each performs a first-of-a-kind exploratory measurement that will help answer fundamental questions about how our planet is changing and how it will change in the future.”

The Orbiting Carbon Observatory will generate knowledge needed to improve projections of future carbon dioxide levels within Earth's atmosphere. Increasing carbon dioxide concentrations have raised concerns about global warming. Even though the biosphere and oceans are currently absorbing about half of the carbon dioxide generated by human activities, the too poorly understood to predict their response to future climate and land-use changes.

Dr. David Crisp of JPL will be the principal investigator for the Orbiting Carbon Observatory, and Bharat Chudasama of Section 380 is the project manager. The mission will include more than 19 universities and corporate and international partners.

Other JPL personnel serving as managers on the project are George Sprague (311), the project system engineering manager and proposal manager, and Barry Weiss (3813), ground data system manager.

THE SCIENCE TEAM ALSO INCLUDES five JPL scientists from JPL's Atmospheric Chemistry Research Element 3243: Drs. Linda Brown, Ross Salawitch, Stan Sander, Bhaswar Sen and Geoffrey Toon. This represents the largest number of JPL scientists on a JPL-managed principal investigator mission, said Crisp.

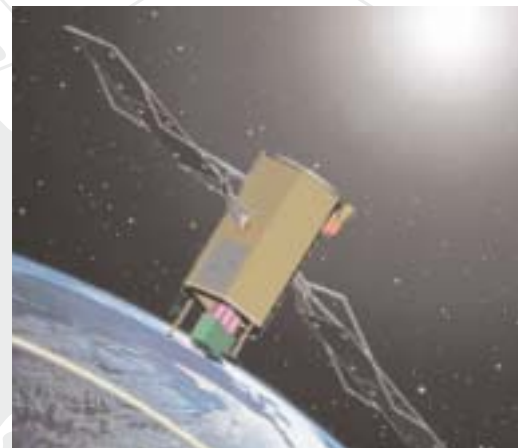
The Orbiting Carbon Observatory Education Office is led by Dr. Gil Yanow (1854). Deb Vane (8600), the deputy principal investigator of the Earth System Science Pathfinder CloudSat mission, also contributed to the education plan.

The observatory's instrument will be designed and manufactured by

Hamilton Sundstrand Sensor Systems Division in Pomona. The spacecraft will be provided by Orbital Sciences, Dulles, Va.

THE AQUARIUS MISSION IS A COLLABORATION between the Argentine Space Program, JPL and NASA's Goddard Space Flight Center. It will provide global maps of ocean-salt concentration on a monthly basis over its planned three-year mission life so that researchers can better understand the nature of Earth's oceans and their role in storage and distribution of heat and thus their role in global climate change.

Amit Sen of Section 387 is the Aquarius project manager, and Goddard's Dr. Chet Koblinsky will serve as principal investigator. The partnership adds to a successful long-standing relationship between NASA and Argentina. In all, over 17 universities and corporate and international partners will be involved in the Aquarius mission.



Other JPL mission team members are project scientist Dr. Yi Chao, project systems engineer David Durham and instrument manager Dr. Simon Yueh. Science/applications team members are Dr. Tim Liu, who

will study surface water fluxes and evaporation, and Dr. Bill Wilson, who is responsible for instrument calibration.

JPL WILL MANAGE THE PROJECT in its formulation and implementation phases through launch, which is scheduled for no earlier than September 2006, from Vandenberg Air Force Base in California.

The Aquarius instrument consists of a JPL-provided scatterometer, and a radiometer provided by Goddard. JPL will test the integrated instrument before it is shipped to Argentina to be integrated with the spacecraft bus. JPL will handle data archiving and distribution, and Goddard will be responsible for data processing.

Following launch, Goddard will manage science operations, and JPL will provide technical support on the instrument.

If selected, the alternate Earth System Science Pathfinder mission, Hydros, would provide the first global view of the Earth's changing soil moisture and surface freeze/thaw conditions, enabling new scientific studies of global change and atmospheric predictability and making new hydrologic applications possible. Launch is now planned for 2007 with at least two years of operation.

THE HYDROS MISSION IS A COLLABORATION between JPL, Goddard, and the Massachusetts Institute of Technology. The project manager is JPL's Dr. Joel Smith, and Hydros is led by Principal Investigator Dara Entekhabi of MIT. Eni Njoku of JPL is one of two project scientists; the other is Paul Houser of Goddard Space Flight Center. Other JPL co-investigators are Jakob van Zyl and Kyle McDonald. The spacecraft bus contractor is Spectrum Astro Inc., and the mission team's contributing partners are the the Italian space agency; Canadian Space Agency; the Integrated Project Office, which is sponsored jointly by the Department of Commerce, Department of Defense and NASA; and the Department of Defense.

Hydros will gather its data in 1,000-kilometer swaths from a sun-synchronous polar orbit with a revisit time of two to three days. The data gathered will consist of brightness temperature measurements by a passive radiometer and backscatter measurements from radar.

NASA will fund up to \$175 million for each of the two selected missions. The selected missions will have approximately nine months to refine their proposals to mitigate risk before mission development is fully underway.

NASA issued an Announcement of Opportunity and initially received 18 proposals, six of which were selected for detailed assessment, with two now moving on toward final implementation.

News Briefs



Most of Los Angeles is visible in this north-northeast perspective viewed from above the Pacific Ocean. In the distance the San Gabriel Mountains rise up to separate the basin from the Mojave Desert, which can be seen near the top of the image. The 3-D perspective view was generated using topographic data from SRTM and an enhanced color Landsat 5 satellite image mosaic.

SRTM data made available worldwide

People around the world will soon get to see Earth in an entirely new way, as NASA extends the release of detailed topographical maps collected during the JPL-managed Shuttle Radar Topography Mission beyond U.S. borders to the rest of the globe.

NASA and the National Imagery and Mapping Agency (NIMA), partners in the mission, earlier this month agreed on a policy to provide 90-meter (295-foot) resolution digital-elevation mission data from sites outside the United States to qualified researchers. Selected data will simultaneously become available to the public. The two agen-

cies also made public the mission's research-quality 30-meter (98-foot) resolution topographic data for the entire continental United States.

"Americans take for granted the quality of U.S. topographic maps, but for millions of people around the world, particularly those in the frequently cloud-covered equatorial regions, the elevation maps created with these data will be 10 times more precise than the best available today," said NASA Administrator SEAN O'KEEFE. "That kind of improvement will lead to significant advancements in aviation safety and mitigation of natural hazards, and to smarter and more sustainable urban development, to name but a few applications."

Shuttle Radar Topography Mission data are being processed at JPL into research-quality digital-elevation models one continent at a time. NASA expects to have all mission data processed and delivered to NIMA by the end of this year. All international 90-meter (295-foot) resolution data is expected to be available to the public no later than two years after JPL makes its final data delivery.

The Shuttle Radar Topography Mission (Feb. 11-22, 2000) made 3-D measurements of more than 80 percent of Earth's landmass between 60 degrees north and 56 degrees south of the equator, areas home to nearly 95 percent of the world's population.

Asteroids for Pathfinder team members

As part of the commemoration of the fifth anniversary of JPL's Mars Pathfinder mission, five members of the Pathfinder team have been recognized with asteroids named in their honor.

JPL astronomer ELEANOR HELIN presented certificates to RICHARD COOK, Pathfinder's flight operations manager; KIRK GOODALL, Pathfinder Web engineer; JENNIFER HARRIS TROSPER, who led the Pathfinder surface operations test program; ROB MANNING, flight system chief engineer; and SAM THURMAN, who led a team that helped develop the Pathfinder landing system.

Each of the asteroids were discovered in 1997 at Haleakala, Hawaii by the JPL Near-Earth Asteroid Tracking Program. Pathfinder landed on the surface of Mars on July 4, 1997.

Program recognizes NASA suppliers

JPL has joined with Goddard Space Flight Center in Maryland on a NASA-wide initiative to communicate the importance of process controls to the agency's suppliers.

Sponsored by NASA's Office of Quality Assurance, the Supplier Outreach and Process Control Program develops policies, procedures, software tools, training and other support for suppliers and their workforce to encourage continuous improvement.

BUCK CRENSHAW, JPL procurement quality assurance manager, and KIEN NGUYEN, program coordinator, visited two suppliers last month in recognition of their joining an "approved suppliers" list. Suppliers can gain this status by requesting and passing a quality-assurance audit.

The pair recognized Mott Corp. of Farmington, Conn., a manufacturer of diverse porous materials that has contributed to the Herschel Space Observatory and Planck Project; and Marotta Scientific Controls Inc. of New Jersey, which develops valves and systems for critical performance, environment, weight and power constraints. Marotta has contributed to the New Millennium Program's Space Technology-5 mission.

Currently, two supplier visits are planned for each month, Nguyen said. The NASA-wide goal, she said, is to create a consolidated list of about 200 suppliers by next fiscal year.

Forms have been sent to JPL project and program managers to suggest suppliers for recognition. For information, call Nguyen at ext. 3-7264.

Child care center has fall openings

The Child Educational Center, founded in 1979 under Caltech and JPL sponsorship, is continuing to enroll children, particularly infants and 2-year-olds, for the upcoming 2002-03 year.

JPL and Caltech families not only receive priority enrollment, but also a tuition discount. Tuition assistance is available for qualifying low- and middle-income families.

For information regarding enrollment or to schedule a tour, call ext. 4-3418. Information about the CEC program is also available online at www.ceconline.org.

Special Events Calendar

Ongoing Support Groups

Alcoholics Anonymous—Meetings are available. Call the Employee Assistance Program at ext. 4-3680 for time and location.

Codependents Anonymous—Meets at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Group—Meets the first and third Fridays of the month at noon in Building 111-117. Call the Employee Assistance Program at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Caregivers Support Group—Meets the first Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Working Parents Support Group—Meets the third Thursday of the month at noon in Building 167-111 (The Wellness Place). For more information, call the Employee Assistance Program at ext. 4-3680.

Friday, July 19

Von Kármán Lecture Series—Galileo science team member Dr. Rosaly Lopes will present "Jupiter's Moon Io: A World of Great Volcanoes" at 7 p.m. in Pasadena City College's Vosloh Forum, 1570 E. Colorado Blvd. For more information, call Public Services at ext. 4-0112 or visit <http://www.jpl.nasa.gov/events/lectures/jul02.html>.



Tuesday, July 23

Investment Advice—A Fidelity representative will be available for one-on-one counseling in T1720-131. For an appointment, call (800) 642-7131.

"Rover Traverse Science: The Opportunities and the Challenges"—Dr.

Robert Anderson of Division 32 and Dr. Rebecca Castaño of the Machine Learning Systems Group will discuss rover traverse science and the roles autonomy can play in future rover missions. This talk will explore how scientists and technologists are working together to create the software necessary for the rover to make onboard science decisions. The lecture is sponsored by the Exploration Systems Autonomy Section and will be held at noon in conference room 167.

"Skymobile"—This unique science outreach program housed in a semi-tractor trailer and sponsored by the Natural History Museum of Los Angeles County will be open on the mall from 9 a.m. to 4 p.m. The museum has worked with several JPL scientists in developing Skymobile, and JPL's Mars Program has supported its development with materials and training. Skymobile travels from school to school on a weekly basis, serving 4th and 5th grade children and teachers within the Los Angeles Unified School District.

Wednesday, July 24

JPL Toastmasters Club—Meeting at 5 p.m. in the 167 conference room. Call Roger Carlson at ext. 4-2295 for information.

Thursday, July 25

JPL Golf Club—Meeting at noon in Building 306-302.

Thursday, August 1

JPL Gun Club—Meeting at noon in Building 183-328.

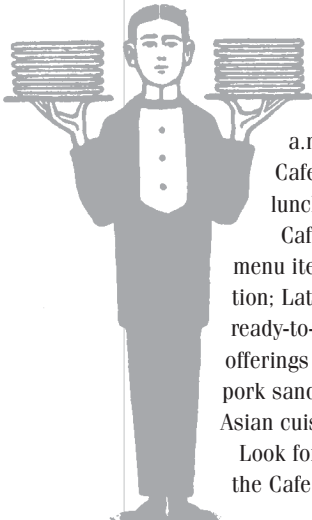
Ongoing

JPL Tennis Club—A round robin is held Saturdays at 9 a.m. at El Molino School tennis courts, at the corner of Del Mar Boulevard and El Molino Street. Parking is available. For information, call Gordon Blackhall, ext. 4-6981 or Jorge Vazquez, 4-6980.

Italian space chief visits Lab

JPL Director Dr. Charles Elachi, left, chats with Prof. Sergio Vetralla, president of the Italian Space Agency, in the Space Flight Operations Facility during Vetralla's visit to the Lab last month. Vetralla also received briefings on topics of mutual interest to his agency and JPL, including Earth science, the Herschel Space Observatory and Planck Project, Cassini Program and Mars Program. He also toured the Low Frequency Instrument Test Facility,

Cafe on the Mall to replace 167 cafeteria during renovation



The cafeteria in Building 167 is finally about to undergo its long-awaited remodel. Beginning Friday, July 26, the cafe will be closed for a 9- to 12-month renovation period. On Monday, July 29, Cafe on the Mall, a tent located between Building 183 and the automated teller machine, will open.

Nancy Kapell of the Employee Services and Recognition Office said the 50- by 100-foot tent includes a dining area that will accommodate approximately 100 people. Additional seating will be located in the patio area next to the Rover Coffee Cart, and cafes 303 and 190 will receive additional seating as well.

Cafe on the Mall will be open from 6:30 a.m. to 3:30 p.m. To help avoid the lunch rush hour, Caltech Dining Services will offer a 5 percent discount to customers who purchase food (in the tent only) from 11 to 11:30 a.m. This promotion will be available for a limited time. Cafes 303 and 190, as well as Cafe on the Mall, will offer lunch from 11 a.m. to 2 p.m. during the 167 renovation.

Cafe on the Mall will offer many of the familiar cafe 167 menu items, such as a breakfast bar, hot cereals and omelet station; Latino Bistro, Rocket Fuel, "Panini" made-to-order deli, ready-to-go sushi, fresh pasta station and coffee blends. New offerings will include Texas style barbecue, featuring barbecued pork sandwiches, ribs, beef brisket and hot wings; carving station; Asian cuisine; and a gourmet salad bar.

Look for future updates on the status of the 167 cafe remodel at the Cafe on the Mall, Daily Planet and Universe.



Photo by Dutch Slagter/JPL Photolab

Taking Care of Business

BRIEFING FOR INDUSTRY

PROVIDES INSIGHT

INTO TEAMING

OPPORTUNITIES AT JPL

BY MARK WHALEN

IN ADDITION, a luncheon address was delivered by Chris Scolese, deputy associate administrator of NASA's Office of Space Science. Scolese is responsible for oversight of the agency's space science flight program, mission studies, technology development and overall contract management of JPL.

Attendees were welcomed by JPL Deputy Director Gene Tattini, who participated in his first such briefing since joining the Lab last year. Tattini said he was "pleasantly surprised" by the strong attendance.

"The feedback I've been getting, both formally and informally, continues to rave about the benefits of attending and what they learned about JPL," Tattini said.

As a result of the day-long forum, Tattini said, JPL has already been approached by several contractors who have expressed interest in partnering with the Lab in the near future.

ONE OF THE GOALS of the meeting was to provide attendees with an opportunity for personal interaction with key JPL staff members, thus Tattini thought the networking and panel discussions were the highlight of the day.

Also, executives from each of JPL's directorates were in attendance, presenting potential teaming opportunities for the business community in the coming years.

Dr. Firouz Naderi, manager of JPL's Mars Exploration Office and director for Solar System Exploration Programs, noted that in the last 10 years the number of JPL projects has more than tripled, with 30 missions expected over the coming decade. The Lab's missions have become smaller but more frequent, and at the same time, the JPL workforce has been reduced by one-third.

In light of that, Naderi emphasized to the gathering that to manage this large number of projects, JPL will recruit, train and retain the best system engineers and project managers and "at the same time will work increasingly with outside organizations."

As a federally funded research and development center and a division of Caltech, Naderi explained, JPL is "about halfway between civil service and industry." The Lab strives to maintain significant depth in core engineering disciplines such as system-level design, he said, while maintaining lesser depth in engineering disciplines easily staffed by contractors, such as detailed design and manufacturing.

IN CREATING A BALANCED PORTFOLIO of in-house and contracted activities, Naderi noted, JPL's goal is to always have at least one in-house project in development, while partnering or contracting with industry and universities for majority of the missions and/or mission elements.

Dr. Fuk Li, deputy director, Solar System Exploration Programs Directorate, said that JPL plans to support principal investigators to pursue missions in NASA's New Frontiers Program, formulating integrated industry/JPL teams "to capitalize on the competitive edges of the team members." New Frontiers is structured and managed along the lines of the highly successful Discovery Program, with mission selection through a fully open and competitive process.

Li also told attendees of numerous teaming opportunities over the next few years in the Discovery Program, the Life Detection Science & Technology Program, Space Exploration Technology Program, Mars Technology Program and New Millennium Program.

Director John Beckman noted that Engineering and Science Directorate plans include "continuing and expanding the use of partnerships to promote and influence the development, infusion, and transfer of applicable technologies and mission concepts," as well as continuing the use of task and task-order contracts to meet the need for rapid technical support.

BECKMAN PROVIDED ATTENDEES with a list of contacts at JPL, including a breakdown of work elements and core competencies within Divisions 31, 32, 33, 34, 35 and 38.

Astronomy and Physics Director Larry Simmons noted that of the directorate's major projects over the next decade, "potential significant contracting opportunities" are available for the Disturbance Reduction System, a Space Technology-7 technology demonstration of precision spacecraft control (launch is planned for 2006); Laser Interferometer Space Antenna, a three-spacecraft constellation for the detection of gravity waves (launch in 2008); Mid-Infrared Instrument for the Next Generation Space Telescope, a facility infrared camera in the 5- to 27-micrometer range (launch in 2010);

More than 200 business leaders from throughout Southern California

gathered last month to learn about potential business opportunities

with JPL. The sixth annual Briefing for Industry at the Pasadena

Conference Center included presentations by all JPL directorates as

well as small-group sessions with Laboratory project representatives,

panel discussions, and net-

working opportunities.



Photo courtesy of Richard Hillquist and Dana Edler

Dr. Diane Evans, left,

and Dr. Bill Weber were

among JPL directorate

leaders who made

presentations at the

Briefing for Industry.

Terrestrial Planet

Finder, which will

detect and charac-

terize Earth-like

planets around as

many as 150 stars up

to 45 light-years away

(launch anticipated in

2012–15); and Keck Interferometer, two 10-meter plus four 1.8-meter telescopes for direct detection of brown dwarfs and warm Jupiters plus study of zodiacal clouds (array first light in 2004–05).

Dr. Diane Evans, director of the Earth Science and Technology Directorate, described NASA's Earth Science Enterprise goals through 2025 on weather, climate and natural hazards, as well as examples of future measurement challenges.

She told the audience two or three Earth-science technology opportunities would be available each year through fy 2007. For Earth System Science Pathfinder missions, one mission will be awarded in fy 03 and another in fy 06.

Interplanetary Network Director Dr. Bill Weber characterized the directorate's challenges as "overcoming today's obstacles and bottlenecks, while increasing mission value."

HE NOTED THAT MAJOR NETWORK INVESTMENTS through fiscal year 2010 include upgrading the current Deep Space Network, demonstrating deep-space optical communications, providing prototype large arrays of small (10-meter) antennas, expanding the Mars network with communication satellites about Mars, and developing new mission and network operations tools and user tools.

Planetary Flight Projects Director Chris Jones pointed out that while subcontracted planetary flight projects work to industry is expected to drop from \$245,000 this year to \$196,000 in fiscal year 2003, it will spike at about \$317,000 for '04. The following year is projected at about \$288,000.

Among the panel discussions offered at the briefing, Bob Cox, assistant director for reimbursable programs, Earth Science and Technology Directorate, described collaborative technology areas, emphasizing developing technologies for NASA with Department of Defense applications. Cox provided attendees with JPL points of contact representing the U.S. Air Force, Army, Defense Advanced Research Projects Agency and civil agencies, other Department of Defense agencies, and the Multi-Agency Program.

Ken Wolfenbarger of Office 1318 discussed Tech Affiliates, a JPL program designed to increase competitiveness for U.S. businesses by utilizing JPL expertise to solve company problems, utilize unique JPL facilities, and support transfer of JPL-developed technology.

OTHER PANELS WERE LED by Byron Jackson of Office 135, who provided an overview of NASA's Small Business Innovation Research Program; Merle McKenzie, manager of JPL's Commercialization Technology and Regional Development Program; Al Pappano, manager of JPL's Collaborative Technology Development Office; and Andre Stefanovich of the Acquisition Division.

"We don't have a specific metric to measure the effectiveness of the event," Tattini said. "But everything I've seen has shown that the resources put into this were very much worth it."

Tattini credited the Acquisition Division for doing "a marvelous job in orchestrating this for us." He said plans call for the industry briefing to be held every other year. In alternating years, JPL will consider a smaller "industry town hall," which might include panel discussions with guests from NASA.

He also noted that directorate leaders, "as busy as they are, all felt the time invested was worth it. There's no question to our guests from industry how seriously we took this."

Interns sought for Mission Architect Development Program



View this and previous issues of Universe online

<http://universe.jpl.nasa.gov>

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Notice to Advertisers

Advertising is available for JPL and Caltech employees, contractors and retirees and their families. No more than two ads of up to 60 words each will be published for each advertiser. Items may be combined within one submission. Ads must be submitted on ad cards, available at the ERC and the Universe office, Bldg. 186-118, or via e-mail to universe@jpl.nasa.gov. Ads are due at 2 p.m. on the Monday after publication for the following issue.

All housing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

As JPL's Mission Architect Development Program enters its sixth year at JPL, the search is underway for qualified participants to join the two-year internship program in July. Under the auspices of JPL's Center for Space Mission Architecture and Design, the Mission Architect Development Program aims to identify, select, and train the next generation of mission architects who will design and implement future JPL missions.

"We need people who can lead the way in changing and improving our processes and, ultimately, our product—as well as enabling a synergy between programs by seeing the bigger picture, and planning for the future," said Nick Thomas, who helped drive the program in its early years, and served as a mentor to many of the program's interns. During each of the first five years of the program, two or three interns were selected to participate.

The Mission Architect Development Program allows interns to work on a variety of projects in a number of disciplines. Interns will have the opportunity to work with the Advanced Projects Design Team (Team X), a team comprising representatives from all the major spacecraft and mission subsystems. Interns help develop mission proposals, become familiar with JPL tools in the automated design process, and work with JPL's industrial partners, gaining valuable perspective on how system design is performed. In addition, interns travel to other NASA centers, fill selected project-specific roles, and work within other JPL Centers of Excellence.

The program is tailored to fit the individual needs of its participants. Interns participate extensively in the planning of their two-year internship. Each intern's plan will be modified to take advantage of his or her expertise and professional interests. Interns' plan will also include study in areas considered to be crucial to his or her development as a well-rounded mission architect. Typical of the classes offered are Introduction to Space

Passings

CHARLES SCHWITTERS, 83, a retired senior engineer associate, died June 26. Schwitters worked at JPL from 1952–84. He is survived by his wife, Eunice, son Steve, daughter Bonnie van der Mark, and three grandchildren. Services were private.

Letters

I would like to thank all my friends, Section 352 and JPL for your support following the recent passing of my father. I was very touched by your kind words, cards and flowers. I would like to remind everyone to take a moment to appreciate their family every day.

Yuki Salinas

Classifieds

For Sale

BABY ITEMS: soft front carrier, Evenflo, \$7; car seat w/base, Century, rear-facing, \$40; bathtub carousel, Safety1st, \$7; all in superb cond., prices are obo; COFFEE MAKERS: Krups, 10 cups, white/gray, like new, \$40/obo; Braun, 10 cups, white/black, like new, \$30/obo. 626/791-6101. BAR, solid oak, 5' X 40" x 2', with brass rail and two upholstered bar stools, \$200/obo; PIANO, Spinet, with bench, Wurliitzer, dark wood, \$700/obo; BEDROOM SET, twin, walnut finish, new mattress and box springs, night stand and chest of drawers, \$250/obo; TABLE SAW, Inca, older, 10", attachments, \$350; BLOCK PLANES, wooden, and antique tools. 346-3136. BED, antique oak & rod iron, queen size w/rails, \$125/obo; SKI SET, used, women's Head, 170s GALA radial & poles, Salomon boots, size 7 + bindings, see pictures @JPL Store, \$120/obo. 626/744-9064. BICYCLE, women's, 29", Centurion Comp TA road bike, equipped with Shimano 600 derailleur, etc, terrific cond., \$60. 956-3745. Steve. CAMCORDER, Sony Hi-8, model CCD-TR81, remote, carry case, 8 blank tapes, works well, \$175/obo. 687-8627. Alberto. CD PLAYER, Yamaha CDC 565, 5 disc, almost new, manual, remote control included, \$60. 626/403-2165. DESK, roll-top, \$125; SURFBOARD, Local Motion Hawaii, 6-ft. \$100; FREEZER, Whirlpool, 19.6 cu ft, \$50; TABLE, folding, 6-ft, heavy duty, metal, \$45; LAWN MOWER, Craftsman, gas, \$35; DESK, small, metal, with lock, \$35; CHAIR, upholstered, with wheels, \$15. 952-6214. DRYER, Whirlpool, full-size, electric, 4 cycles, 13 temperatures, exc. cond., \$120/obo. 626/644-7361, day or 626/345-0413, eve. HIKING BOOTS, ladies, Vasque, new, leather, size 7, \$70. 626/798-6248. INSECT KILLER, Flowtron, \$10. 626/358-7390. LANGUAGE BOOK/AUDIO TAPES, "Colloquial Croatian and Serbian: Complete Course for Beginners" by Celia Hawkesworth, used, vg cond., \$30/obo. 323/268-6645, Priscilla. LUGGAGE RACK, rooftop, \$20. 626/797-6982. MTN BIKE PARTS, from early 1990s, Shimano, Suntour and others, some new, most slightly used, too much to list, will e-mail a complete list if interested, take all for \$75. 640-7479, Greg. POTTED PLANT, Ficus Benjaminia tree, about 15 ft. tall, 6 ft. wide, in large ceramic pot, used as outdoor front entrance décor, live, healthy and well maintained, \$150. 626/339-5511. PRINTER, color Apple StyleWriter 4100, almost new, needs ink cartridges, complete with software and cables, \$40/obo. 323/255-8635. REFRIGERATOR, 18 cu. ft., Frigidaire, white, less

than 6 mo. old, \$300/obo. 626/355-3621. REFRIGERATOR, off-white, 18 cu. ft., Kenmore Goldspot, less than 1 yr old w/1 yr of warranty remaining, avail. Aug., \$400/obo. 626/289-6359. SHIRTS, new men's dress, long sleeve, 17 neck, assorted colors/stripes, new Hawaiian, L & XL, \$7/ea.; SLACKS, 42-44 waist, \$10; SUITS, 44-46, \$15; SPORT COATS, \$10; all in exc. cond. 790-6060. SINK, bathroom, white, pedestal, 25 1/2" x 21 1/4", 8" center; pop-up drain, includes faucet assembly, barely used, \$150/obo. 626/358-7390. SOFA SLEEPER, makes into qn. size bed, abstract black, blue & mauve design, gd. cond., \$300; BIKES, children's, 4, need TLC, \$15/ea. 626/357-8210.

SOFAS, 2, white, new, can link together, firm and comfortable, many pillows to match, easy to move, \$200. 626/254-0886, after 6 p.m. TV, Mitsubishi 50" big screen, beautiful wood cabinet, front projection, \$500, 790-1893. VENDING MACHINES (9), table top, 9 slots, holds approx. 114 pieces of candy, manual, no elec., \$1,000. 661/816-7799, Stan.

Vehicles/Accessories

'89 BAYLINER Capri boat, 19 ft. Cobra inboard/outboard, vg cond., approx. 40 hrs on eng., grt. family ski/fish boat, am/fm cass., many extras: skis, vests, life jackets, full canvas, etc., new tires on trailer, ready for summer, photo: www.mogensigns.com/boat.htm, \$6,800/obo. 352-4102. '88 BAYLINER 2655, 460 CI, King Cobra I/O, Lorran, Fish Finder radar, fresh water cooling, VHF and more, pictures at ~dprice1551@earthlink.net, \$19,500. 805/496-9572. '97 BMW 328i, convertible, silver with black soft top, gray leather interior, 12,800 mi., mint cond., loaded w/sport pkg., 6-disc CD changer, dual-zone climate control & more, must see to believe, \$27,500. 952-5689. '81 CHEVROLET Corvette, silver/charcoal metallic, black interior, 193K mi., fair cond., \$4,000. 661/299-4999. '01 FLEETWOOD/Coleman folding trailer, 26', Niagara Elite, top of the line, 2 king beds, dining slide out, extras, retail range is \$10K - \$12K, sell for \$9,800. 661/266-1259. '98 FORD Ranger XLT, great cond, wht, 2 dr, V6, 4.0, 83K mi, 6" body lift, off-road tires, custom brush guard, pwr. everything, a/c, ABS, am/fm/cass, bedliner, tow hitch, spotlight, photos: code3media@crowmivc.net, \$13,000/obo. 822-6465. '95 FORD Windstar XL minivan, rear air, quad seating (4 captain's chairs + bench for 3); console, roof rack, privacy glass, + many more features, 89K mi., one owner with all records, runs great, \$5,500. 626/447-6423. '96 FORD Escort LX, 2 dr. hatchback, stick shift, a/c, stereo, only 60K mi., great commuter car, exc. cond., \$4,150. 909/985-6806. '90 FORD Taurus L, 4-dr. sedan, 3L V6, auto., cruise, a/c, power locks, radio/cass., 101K mi., gd. cond., drives well, \$1,850. 323/845-9340. '87 FORD F-250 PU, 460cid, V8, 4:10-1 diff. auto, a/c, am/fm, PS/PB, cruise, new tires, 5th wheel hitch/bed cover, 43K mi., good cond., strong tow veh, records available, renewed lic-Jan. cab top air foil, smog test, \$5,000/obo. 626/963-5727. '73 FORD Explorer XLT, 4 dr., 2 WD, loaded, new tires and battery, 105K miles, great cond., \$6,000. 249-0573. '67 FORD Mustang 390, 4-speed S Code coupe, Ford Blue exterior, new interior, great condition, must see, \$6,500/obo. 626/339-9353, Greg. '66 FORD Mustang, 4 spd., V6, original engine overhauled, new upholstery, brakes need work, tow away only, \$2,500. 790-6136. '00 HONDA Nighthawk motorcycle, 250cc, black, 962 original miles, exc. cond., always housed in a garage, \$2,400. 626/792-7753, after 6 p.m. '00 HONDA Odyssey 2000 EX, 3.5 V6, auto, a/c, in-dash CD, CD changer, electric rear doors 44,400+ mi., \$23,500. 661/816-7799, Stan. '96 HONDA Civic EX coupe, loaded, manual trans, 73,000 miles, dark green, must sell, \$8,000. 626/357-4849, Tony. '91 INFINITI G20, fair cond., \$2,800. 957-3675. '91 ISUZU Trooper LS, V6, 2.8L, 4WD, white, 5 sp. manual, a/c, am/fm/cass, p/s, p/w, cruise control, orig. owner, 90,000 miles, new trans and clutch, VG cond., \$3,500. 626/398-0921. '93 Jeep Wrangler, 5 spd., exc. cond., ~85K mi., runs great, new battery & tires, am/fm/cd, locking console & trunk, photos at <http://www.mogensigns.com/jeep.htm>, \$7,300/obo. 352-4102.

Science for Mission Architects, Introduction to Mission Operations, JPL Proposal Preparation, and Principles of Astrodynamics & Mission Design. And interns will be paired with a qualified mentor responsible for guiding and counseling that intern through the program.

Qualities being sought in potential interns include strong technical and problem-solving skills, leadership in technical innovation, and skills necessary to mentor and help others succeed. The selection committee seeks candidates with the following criteria:

- Significant technical skills and knowledge in the area of flight systems
- Effective communication skills
- Proven leadership abilities
- Innovative "Out-of-the-Box" thinking

To be considered you must be a full-time, benefit-based JPL employee, possess a bachelor's degree or equivalent work experience and have a minimum of five years of work experience that includes significant flight systems background. To apply for the program, submit a resume and a one- or two-page letter, with concurrence by your division manager, stating why you should be considered. Send the two documents to Tabitha Joiner, Human Resources Staffing, T1720-C, by Friday, Aug. 16. Applicants and their division manager should also retain copies. A Human Resources representative will forward them to the selection committee for consideration. The committee will interview finalists, and then select the Architect Development Program class of 2005.

All applicants will be informed of the selection committee's decision on Nov. 1.

For additional information, visit the Mission Architect Development Program's Web site at <http://eis/adb> or contact Mark Lopez at ext. 3-6878 or Brindley McGowan at 4-0901.

w/walk-in closet, laundry rm. area, \$1,200 w/2-car gar. or \$1,000 w/out garage. 626/256-0015. PASADENA, near Caltech, very nice, large, 2 bd., 2.5 ba., w/hardwood floors, fireplace, patio, a/c, washer/dryer, refrig, stove, new carpet, 2 car parking, \$1,600. 626/441-6955. PASADENA, apt. to share, 2 bd., 2 ba., + loft, in luxury security complex nr Colorado/ Lake, living rm, loft & kitchen fully furn., DSL, balcony, pool, Jacz., gym, avail. Aug. 16, \$750. 626/644-5431. PASADENA, 1 bd. in a 2 bd., 1 ba. house, all privileges, male preferred, no pets, quiet area, walking dist. to Caltech & PCC, \$325 dep. & 1st mo. rent required, \$375 + util. 626/844-0425. PASADENA, spacious 2-story condo, 3 bd., 2.5 ba., prestigious community, beaut. inter., bright ktch., prof. landscape, ctrl. air/heat, close to shops/schools, cozy l/r w/FP, end unit, frml. d/r, hdwd. flrs., immac. cond., \$1,750. 626/396-9024. PASADENA guest house, above Eaton Cyn. golf course, beautiful setting, about 1,000 sq. ft., washer & dryer, ideal for 1 person with a very quiet lifestyle, \$895 plus util. 626/798-4056. PASADENA, female preferred to share 2 bd., 2 ba. apt., near 210 fwy, separate phone line, mo.-to-mo. lease, secured bldg., pool, whirlpool, BBQ, laundry facil. in complex, \$600 + half util. (gas, electric, cable ~\$60). 626/795-8197, Denise. SIERRA MADRE, small, charming, 2 bd. home, 1 ba., carpeted, stove, laundry room, storage, fenced yard, flowers, great neighborhood, water and trash included, 15 min./JPL, avail. Aug. 1, \$1,275. 626/355-3492. SYLMAR, spacious, 4 bd., 2.5 ba., 2,788 sq. ft., rent to own, gated, view, new pool, \$10,000 credit toward purchase, \$2,395. 626/584-6526.

Real Estate

SILVERLAKES, Calif., resort, 2 bd. condo for up to 6, 4 weeks free golf anytime each year at private PGA-rated course with driving range and putting greens, two lakes, many amenities, less than 2 hours from Pasadena, exchange rights with 3,000 resorts, reduced to sell due to illness, \$15,000, easy terms. 805/967-7725.

Vacation Rentals

BIG BEAR LAKEFRONT, luxury townhome, 2 decks, tennis, pool/spa, beautiful master bd. suite, sleeps 6. 949/786-6548. CAMBRIA, ocean front house, sleeps up to 4, exc. view. 248-8833. HAWAII, Kona, ocean front on Keauhou Bay, house + guest house comfortably slp 6, 3 bd., 2 ba., rustic/relaxing/beautiful, swimming, snork-eling, fishing, spectacular vw, near restaurants, golf and other attractions. 626/584-9632. LAKE TAHOE, N. Shore, condo, 2 bd., 2.5 ba., slps 6, pool, priv. beach, all amenities, conv. location, 2 mi./casinos, avail. by the week only, special JPL discount. 626/355-3886, Rosemary/Ed. MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft, sleeps 6-8, fully equipped kitchen incl. microwave, D/W, cable TV, VCR, phone, balcony w/view to mtns., Jacuzzi, sauna, streams, fishponds, close to Mammoth Creek, JPL discount. 626/798-9222 or 626/794-0455. MAMMOTH townhome, sleeps 8; TV, VCR, pool, Jacuzzi, sauna, laundry, gameroom; tasteful decor; JPL discount (3rd night free). 626/794-6860, eves. OCEANSIDE condo, fully furn., 2 bd., 2 ba., fire-place, full kitch., quiet, relaxing, beautiful beach-side setting; BBQ, pool, spa, game rm, great ocean vw, easy walk to pier & restaur., sleeps 8; avail. weekly or monthly. 909/981-7492 or dfhauge@yahoo.com, Darlene. OCEANSIDE, on the sand, charming 1 bd. condo, panoramic view, walk to pier & harbor, pool/spa, game rm., sleeps 4. 949/786-6548. PUERTO VALLARTA, Villa del Mar, lg. studio, sleeps 4 max, rooms have microwave, kitchen, phones, cable TV, priv. patio, 3 pools, 3 restaurants, spa, priv. beach, charming town, top-rated resort, avail only 12/28/02 - 1/4/03, on-site New Year's Eve Fiesta, see http://www.myuvc.com/puerto_vallarta.shtm. 541-1340. ROSARTO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906. SILVERLAKES, Calif., resort, 2 bd. condo for up to 6, 4 wks free golf each yr. at priv. PGA-rated course w/driving range and putting greens, 2 lakes, many amenities, less than 2 hrs./Pasadena, exchange rights w/3,000 resorts, reduced to sell due to illness. 805/967-7725.